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Dynamic Programming And Optimal Control (2 Vol Set)

VOLUME 2 · 4th EDITION

Dynamic Programming and Optimal Control

APPROXIMATE DYNAMIC PROGRAMMING

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Athena Scientific
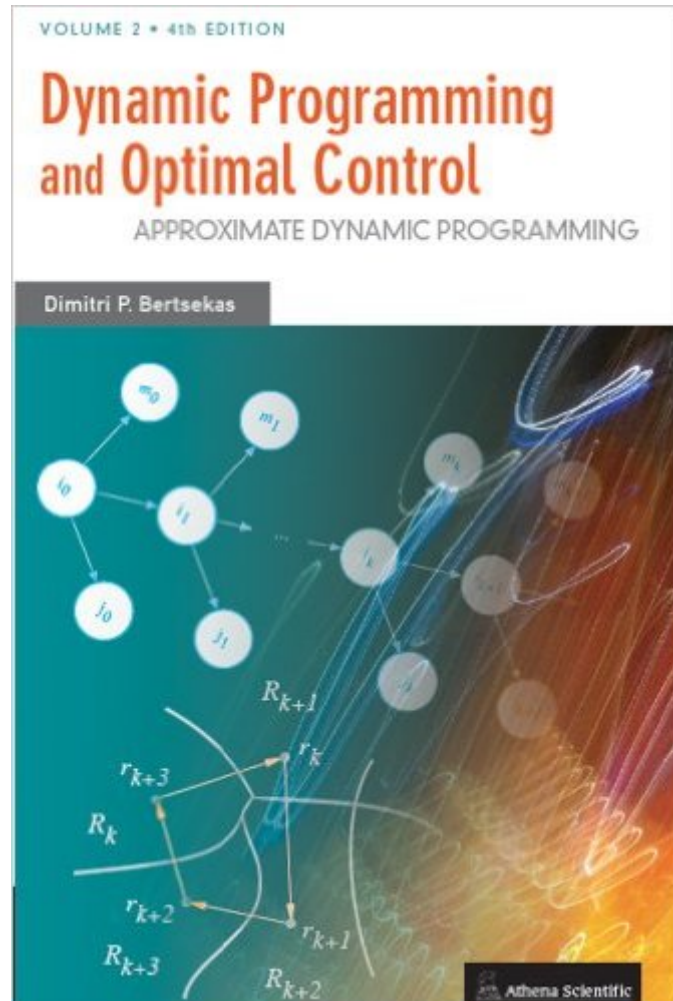
Synopsis

A two-volume set, consisting of the latest editions of the two volumes (3rd edition (2005) for Vol. I, and 4th edition (2012) for Vol. II). Much supplementary material can be found at the book's web page. The first volume is oriented towards modeling, conceptualization, and finite-horizon problems, but also includes a substantive introduction to infinite horizon problems that is suitable for classroom use. The second volume is oriented towards mathematical analysis and computation, treats infinite horizon problems extensively, and provides an up-to-date account of approximate large-scale dynamic programming and reinforcement learning. This is a textbook on the far-ranging algorithmic methododogy of Dynamic Programming, which can be used for optimal control, Markovian decision problems, planning and sequential decision making under uncertainty, and discrete/combinatorial optimization. The treatment focuses on basic unifying themes, and conceptual foundations. It illustrates the versatility, power, and generality of the method with many examples and applications from engineering, operations research, and other fields. It also addresses extensively the practical application of the methodology, possibly through the use of approximations, and provides an introduction to the methodology of Neuro-Dynamic Programming, which is the focus of much recent research.

Book Information

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Customer Reviews

*This is easily the best book on dynamic programming. It certainly is the most up-to-date book on this topic. The first volume covers numerous topics such as deterministic control, HJB equation for the deterministic case, Pontryagin principle, finite horizon MDPs, partially observable MDPs, and

rollout heuristics. The second volume treats the infinite horizon case for the regular MDP --- average reward, discounted reward, semi-Markov control, and even some reinforcement learning.*I love the notation. The proofs in this book are much easier than those you will find elsewhere. (This opinion is based on my study of proofs in other texts.) The treatment is very sophisticated and yet very accessible! Furthermore, what is really a bonus here --- something you won't find in the other books --- is a discussion on the stochastic shortest path (SSP). The SSP makes it so easy to analyze the average reward problem and the finite horizon problem with a stationary transition probability structure.*I strongly recommend this book to all readers interested in understanding the basics of DP and the convergence proofs underlying the DP machinery. It is a must on your book shelf if you are working on research in DP or topics related to DP such as reinforcement learning or adaptive (approximate) DP.

I've read the textbook dealing with DP up to chapter 6. Since this book is approached mathematically, I think it is very well made except a few typos. A bit of unsatisfactoriness for me is the style of the book. I prefer the style introducing the general result first, and then proves why they are derived and where they are derived from. And then, many examples are very helpful for readers like me. However, this book introduces examples first, and then constructs the general form from and using the examples. I am sure that everybody has different styles. My word is just not my type. Nevertheless, the contents that textbook handles are wonderful.

This book is written for the mathematically inclined. If you have a solid background already, and want to deepen your understanding then this is the book for you.

It's a good book for dynamic programming, though it requires substantial knowledge of mathematics.

really nice book on dynamic programming... easy to understand and contains all requisite details.

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